

cu



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/606,980	06/27/2003	Edward J. Hubbell III	5308-260	6448

20792 7590 12/16/2004

MYERS BIGEL SIBLEY & SAJOVEC
PO BOX 37428
RALEIGH, NC 27627

EXAMINER

MULLER, BRYAN R

ART UNIT	PAPER NUMBER
----------	--------------

3723

DATE MAILED: 12/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/606,980	Applicant(s) HUBBELL, EDWARD J.	
	Examiner Bryan R Muller	Art Unit 3723	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 October 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6, 10, 15 and 16 is/are rejected.
- 7) ☒ Claim(s) 5, 7-9 and 11-14 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 June 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of claims 1-16 reading on invention I in the reply filed on October 12, 2004 is acknowledged.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1, 15 and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by WeissHaus (6,165,051).
4. In reference to claim 1, WeissHaus discloses a monitoring system for dicing saws that senses the speed of the saw blade and monitors the load placed on the blade and controls the speed of the spindle, the feed rate of the substrate or the cutting depth of

the saw (col. 3, lines 14-17). Therefore, the method of controlling the semiconductor dicing saw comprises dynamically adjusting a saw cut pattern of the semiconductor dicing saw during a sawing operation of at least a portion of the semiconductor wafer.

5. In reference to claim 15, Weiss Haus discloses the method of controlling a dicing saw as discussed supra and further disclose that this type of procedure is used extensively for separation of die on silicon integrated wafers (col. 1, lines 25-27).

6. In reference to claim 16, Weiss Haus discloses the method of controlling a dicing saw as discussed supra and further disclose that the process provides a versatility in selection of depth and can be used to saw either partially or completely through a wafer (col. 1, lines 20-23).

7. Claims 1, 10 are rejected under 35 U.S.C. 102(b) as being anticipated by anticipated by Herko (5,668,061).

8. In reference to claim 1, Herko discloses a semiconductor dicing saw that uses a CCD camera (62) that is mounted on the dicing saw holder (64) that mounts the saw blade (40). The camera receives light that is reflected off the wafer and generates electronic signals corresponding to the location of fiducial marks (that are used to line up the saw at the location of the desired cuts to be made) and stores the signals in it's memory in order to align the dicing saw with the fiducial marks (col. 3, lines 40-49). Therefore, the method of controlling the semiconductor dicing saw comprises dynamically adjusting a saw cut pattern of the semiconductor dicing saw during a

sawing operation of at least a portion of the semiconductor wafer to align the saw with the fiducial marks for each cut.

9. In reference to claim 10, Herko discloses the semiconductor dicing saw as discussed supra that maps the shape of the fiducial marks on the semiconductor wafer through the use of the CCD camera and its memory.

10. Claim 1 is rejected under 35 U.S.C. 102(e) as being anticipated by anticipated by Sekiya (US 2001/0032533).

11. Sekiya discloses a cutting apparatus (10) that comprises a rotary blade (24) for use in dicing a semiconductor wafer (paragraphs [0043]-[0044]) therefore, making it a dicing saw. The saw dynamically adjusts the saw cut pattern being performed on the semiconductor during the sawing operation in that changes to the path of the sawing blade are made during cutting based the desired location of the cuts and feedback from sensors that determine the correct location of said cuts or streets (paragraphs [0048] – [0051]). Therefore, the method of controlling the semiconductor dicing saw comprises dynamically adjusting a saw cut pattern of the semiconductor dicing saw during a sawing operation of at least a portion of the semiconductor wafer.

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 2, 3, 4 and 6 rejected under 35 U.S.C. 103(a) as being unpatentable over Sekiya in view of Sakai (JP 63319110 A).

14. In reference to claim 2, Sekiya discloses the method of controlling a dicing saw as discussed supra and further discloses that subsequent to cutting along the detected street of the semiconductor wafer, the unit is moved so that the rotary blade may cut the adjacent street on the semiconductor wafer (paragraph [0051]) and that after completing the cutting along each and every street in one direction, the chuck table rotates 90 degrees to repeat the street cutting in a transverse direction to the first set of cuts. Sekiya, however, does not disclose how the apparatus determines that each cut is finished to move on to the next cut. Sakai discloses a device for separating individual semiconductors from a wafer using a cutter, which has a strain gage attached that acts as to determine if the cutter is in contact with the wafer by sensing the strain placed on the cutter. The cutter moves towards the wafer and when the cutter makes contact with the wafer, a stress produced on the cutter causes the strain level to increase. When the strain level reaches a certain level or threshold, it is recognized by the controller that the cutter is in contact with the wafer and the cutter is driven downwards to cut off and separate the individual semiconductor from the wafer. Thus, it would be obvious that once the cutter completed the cut, it would no longer be in contact with the wafer and the strain level would return to a level below the threshold. Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to provide the dicing saw of Sekiya with a strain gage that would signal the controller when the

Art Unit: 3723

cutting blade is or is not in contact with the wafer in order to allow the controller to determine when to a cut is finished and actuate the dicing saw to proceed to the following cut without hesitation. Thus, saving the time that may be lost using other techniques to determine when a cut is finished and saving money that may be spend to employ a person to manually determine the end of each individual cut. Therefore, the method of controlling the semiconductor dicing saw comprises dynamically adjusting a saw cut pattern of the semiconductor dicing saw based on detection of a saw blade of the dicing saw contacting the semiconductor wafer.

15. In reference to claim 3, based on the combination of the strain gage of Sakai and the dicing saw of Sakiya as discussed supra, it would be obvious that once a cut is finished by the dicing saw, the strain gage will signal that the saw blade is no longer in contact with the wafer and the controller would advance the dicing saw to make the next cut. Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made that the method of dynamically adjusting would comprise terminating a current saw cut of the semiconductor dicing saw based upon detection that the saw blade no longer contacts the semiconductor wafer and proceeding to a subsequent saw cut upon termination of the current saw cut.

16. In reference to claim 4, based on the combination of the strain gage of Sakai and the dicing saw of Sakiya as discussed supra, it would be obvious that once the dicing saw was positioned to begin the next cut, it would advance towards the wafer as disclosed by Sakai, and once the strain gage signals that he saw blade is in contact with the wafer, the cut would begin. Therefore, it would be obvious to one of ordinary skill in

the art at the time the invention was made that the method of dynamically adjusting would comprise proceeding to a subsequent saw cut further comprises beginning the subsequent saw cut at a start position based upon detection of when the saw blade is in contact with the semiconductor wafer during the current saw cut.

17. In reference to claim 6, based on the combination of the strain gage of Sakai and the dicing saw of Sakiya as discussed supra, it would be obvious to one of ordinary skill in the art at the time the invention was made that dynamically adjusting a saw cut pattern of the semiconductor dicing saw based on detection of a saw blade of the dicing saw contacting the semiconductor wafer comprises detecting a level of strain of the saw, provided by the strain gage of Sakai, during a saw cut and dynamically adjusting a saw cut pattern of the semiconductor dicing saw based on the detected level of strain indicating when the saw blade is contacting the semiconductor wafer.

Allowable Subject Matter

18. Claims 5, 7, 8, 9 and 11-14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

19. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Boucher (5,718,615 and 6,152,803), Wildes (5,865,163), Manor (Pub. 2002/0031899 A1), Marooka (5,628,673) and Dass (6,357,330) all disclose

methods for controlling semiconductor wafer saws. Koide (3,618,270) discloses a lath that senses the strain in the driving member to monitor and control the operation of the machine.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bryan R Muller whose telephone number is (703)305-0487. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph J Hail III can be reached on (703)308-2687. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

BRM BRM
12/10/2004



Joseph J. Hail, III
Supervisory Patent Examiner
Technology Center 3700